



Schneider Electric I/A Series C Intelligent Pressure Transmitters

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## About Schneider Electric

As a global expert in energy management and automation, Schneider Electric is leading the digital transformation to achieve efficiency and sustainability. The Group employs more than 135,000 people in more than 100 countries worldwide, and registered sales of 25.2 billion euros in FY 2020.

The purpose of Schneider Electric is to **empower all to make the most of our energy and resources, bridging progress and sustainability for all**. We call this **Life Is On**. Our mission is to be your **digital partner for sustainability and efficiency**.

We **drive digital transformation**, to serve the home, building, data center, infrastructure and industrial markets. We integrate world-leading processes and energy management technologies and provide end-point to cloud integration connecting products, controls, software and services to run through the full business life cycle for integrated company management.

We are the **most local of global companies**. We are committed to advancing an open technology and partnership ecosystems, and we also actively promote shared **meaningful purpose, inclusive and empowered** values.

## Schneider Electric in China

- China has become the group's second largest market in the world
- Over 17,000 employees in China
- **4 R&D Centers and 1 Schneider Electric Online Learning and Development Center**
- 23 factories, 7 logistics centers, 10 branches, and 37 offices throughout China



# Product Overview

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## Overview

The I/A Series C intelligent two-wire pressure transmitters accurately and reliably measure gauge pressure, absolute pressure, differential pressure, or liquid level, converting these measurements into a 4-20mA current output signal (with HART communication), or digital signals using FOUNDATION Fieldbus, PROFIBUS-PA communication protocols. They can be configured through software for remote configuration and monitoring.



## Product Features

- Monocrystalline silicon sensor technology has been proven successful in field applications.
- The sensor design is simple and elegant, with minimal components and high reliability.
- Measurement accuracy: 0.05%.
- Turndown ratio: 100:1.
- Differential pressure transmitters can withstand unidirectional and bidirectional overload up to 42 MPa.
- Pressure transmitters can withstand overload up to 105 MPa.
- Response time  $\leq 125$  ms.
- Minimum differential pressure:  $\pm 100$  Pa.
- Housing features a durable corrosion-resistant coating, compliant with IEC IP66/67 requirements.
- Process-wetted materials: industry-standard 316L SS, with other materials available.
- Multiple communication protocols: HART (7.0), FOUNDATION Fieldbus, PROFIBUS-PA.
- Configuration and diagnostics available via a handheld HART-protocol terminal.
- Electromagnetic compatibility (EMC) meets the interference immunity requirements specified in GB/T 18268 and IEC 61326.
- Optional features and accessories significantly expand the transmitters' capabilities.
- SIL2 certified.

# Transmitter Functionality

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## I/A Series C Intelligent Pressure Transmitters

Schneider Electric Series C Pressure Transmitters comprise a complete product line including gauge pressure, absolute pressure, differential pressure transmitters, and flange-mounted transmitters with remote or direct installation capabilities. All these transmitters feature field-proven monocrystalline silicon sensors and share the same upper assembly with interchangeable intelligent electronic modules.

### Power Supply Requirements and External Loop Load Limits (Fig. 1)

Power supply voltage (U) range:  $10.5V \leq U \leq 45V$

PA, FF fieldbus power supply voltage (U) range:  $9V \leq U \leq 32V$

For intrinsically safe transmitters, power should be supplied through safety barriers with explosion-proof certification.

Transmitter loop load resistance:

$$R \leq \frac{U-10.5}{0.023} (\Omega)$$

(R should include the safety barrier resistance in intrinsically safe circuits)

For loop requiring HART communication:

$230\Omega \leq R \leq 500\Omega$ ,  $15.8V \leq U \leq 45V$

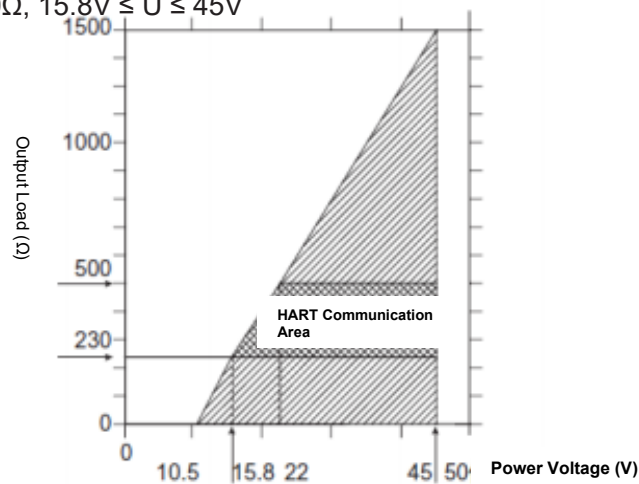


Fig. 1: Correlation between Power Voltage and Output Load

#### Notes:

If the transmitter is not connected to a handheld configurator or PC configuration software, it can operate with an output load less than  $230\Omega$ . When connected to a handheld configurator or PC configuration software, a minimum load of  $230\Omega$  is required.

### **Electromagnetic Compatibility**

Compliant with the interference immunity requirements specified in GB/T 18268 and IEC 61326.

### **Positive/Negative Zero Shift**

Allowed for positive/negative zero shift.

For gauge pressure transmitters: the maximum positive shift is the difference between the upper range limit and the minimum span; the maximum negative shift not more than the atmospheric pressure.

For absolute pressure transmitters: the maximum positive shift is the difference between the upper range limit and the minimum span; no negative shift allowed.

For differential pressure and level transmitters: the maximum positive shift is the difference between the upper range limit and minimum span; the maximum negative shift is the upper range limit. For models with the lower range limit of 500kPa on the low-pressure side, the maximum negative shift is 500kPa.

### **Output Signal and Configuration**

Output signals can be configured as digital outputs or 4-20mA analog outputs through compatible analog or digital I/O cards and system workstations such as I/A Series DCS, handheld configurators, or keypad and LCD display.

### **Fault Alarm**

When transmitter faults occur, the self-diagnostic program automatically sends warning messages or user-defined alarm currents. Fault information can be accessed via the handheld configurator.

### **Reversed Wiring Protection**

Accidental wiring reversal will not damage the transmitter.

### **Adjustable Damping Time**

Adjustable from 0s to 100s through communication or local configuration.

### **Effect of RF Interference**

When properly installed with the conduit shielded and grounded and the module cover secured, the output error is less than 0.0325% of the span for RF interference in the range of 80 to 1,000MHz with a field strength of 30V/m (in accordance with GB/17626-3(IEC 61000-4-3) standard).

### **Effect of Vibration**

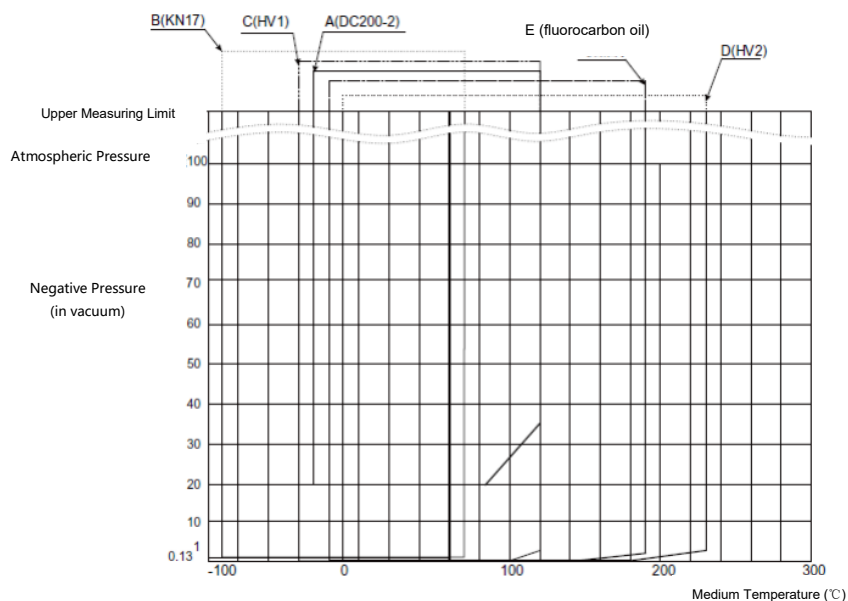
The total influence is less than  $\pm 0.00325\%$  of the span under vibration conditions of 10 to 55Hz frequency range with a  $\pm 0.15\text{mm}$  (2.5in) amplitude.

### **Transient Effect of Switching and Indirect Discharge**

The transmitter can withstand transient surge voltages of up to 2,000V in common mode or 1,000V in differential mode without permanent damage. The output drift remains less than  $\pm 0.00325\%$  of the span (in accordance with GB/17626-5(IEC 61000-4-35) standard).

### **Correlation between Minimum Allowable Absolute Pressure and Process Temperature**

When using silicone oil as the filling fluid, full vacuum operation is permitted up to 230°C. Please refer to Fig. 2.



### Applicable Scope

B — DC200-2	-30 — 120 °C	1.07 g/cm <sup>3</sup> , Minimum vacuum 20 kPa, Coordinates (-30, 20; 82, 20; 120, 36; 120, max working pressure; -30, max working pressure)
L — KN17 low-temperature oil	-90 — 70 °C	0.914 g/cm <sup>3</sup> , Minimum vacuum 1 kPa, Coordinates (-90, 1; 70, 1; 70, max working pressure; -90, max working pressure)
G — HV1	-40 — 120 °C	0.96 g/cm <sup>3</sup> , Minimum vacuum 0.13 kPa, Coordinates (-40, 0.13; 100, 0.13; 120, 2.7; 120, max working pressure; -40, max working pressure)
V — HV2	-10 — 230 °C	1.09 g/cm <sup>3</sup> , Minimum vacuum 0.13 kPa, Coordinates (-10, 0.13; 180, 0.13; 230, 2.7; 230, max working pressure; -10, max working pressure)
K — fluorocarbon oil HV4	-20 — 190 °C	1.83 g/cm <sup>3</sup> , Minimum vacuum 0.13 kPa, Coordinates (-20, 0.13; 165, 0.13; 190, 2.7; 190, max working pressure; -20, max working pressure)

Fig. 2: Vacuum vs. Temperature Curve of Filling Fluid

### Zero and Span Adjustment

The zero and span can be adjusted through a system workstation (using compatible analog or digital I/O cards), a handheld configurator, or the buttons and LCD display.

### High Performance

The transmitters utilize microprocessor-based measurement correction to ensure exceptional accuracy and ambient temperature compensation.

### Easy Installation

The rotatable upper assembly facilitates installation in space-constrained locations, and allows for custom display orientation and field modifications.

The dual conduit entries allow for selection of the most convenient entry position for condensation drainage, independent of the mounting position and upper assembly rotation.

### LCD Display

The transmitters feature a two-line digital display (Fig. 3) that shows measured values with their corresponding units. Zero and span adjustment and local configuration can be performed using the buttons without requiring a handheld terminal.

### The display includes:

- Two lines: the top line displays five numeric characters; the bottom line shows seven alphanumeric characters;
- Measured value: the value appears on the top line, with the unit on the bottom line.

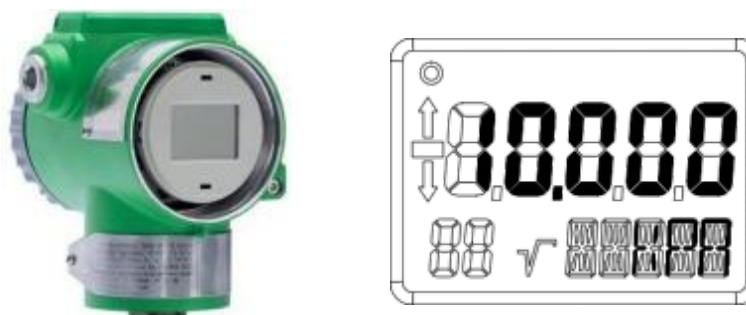


Fig. 3: LCD Display

The three buttons (Fig. 4) provide access to the following configuration and calibration functions:

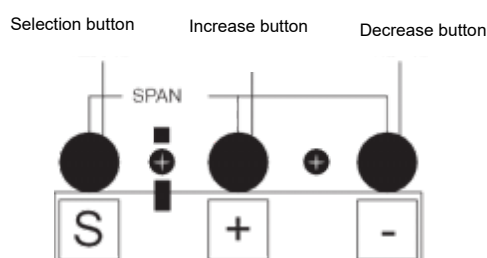


Fig. 4: Button Functions

Zero setting with reference pressure, span setting with reference pressure, damping time, zero setting without reference pressure, span setting without reference pressure, zero pressure adjustment, analog output of constant current, current selection for fault alarm, function disabling, output mode (for differential pressure only), square root at activation point (for differential pressure), display mode selection, pressure unit selection, and process parameters.

### Pressure Units

inH <sub>2</sub> O	psia	Pa	atm	m4H <sub>2</sub> O (mmH <sub>2</sub> O at 4°C)
ftH <sub>2</sub> O	psig	kPa	bar	i4H <sub>2</sub> O (inH <sub>2</sub> O at 4°C)
mmH <sub>2</sub> O	inHg	MPa	mbar	torr
mH <sub>2</sub> O	mmHg		gf/cm <sup>2</sup>	
			kgf/cm <sup>2</sup>	

### Communication

#### Communication Formats

The transmitters can be configured for either analog (4 to 20mA) or digital (fixed current) communication. Digital communication can be achieved through either of two different frequency signals superimposed on the continuous current signal transmitted along the two power/signal wires.

#### Communication Distance

- HART protocol

Digital communication between the transmitter and handheld terminal can extend up to 3,050m, with a data transmission rate of 1,200 baud. A minimum circuit load of 230Ω is required.

- PA and FF protocols

These protocols use shielded twisted-pair cables, allowing communication distances of up to 1.8km, or up to 1.0km in flameproof (EEx) applications.

The actual communication distance varies depending on the cable models used.

### Function Diagram of Intelligent Transmitter

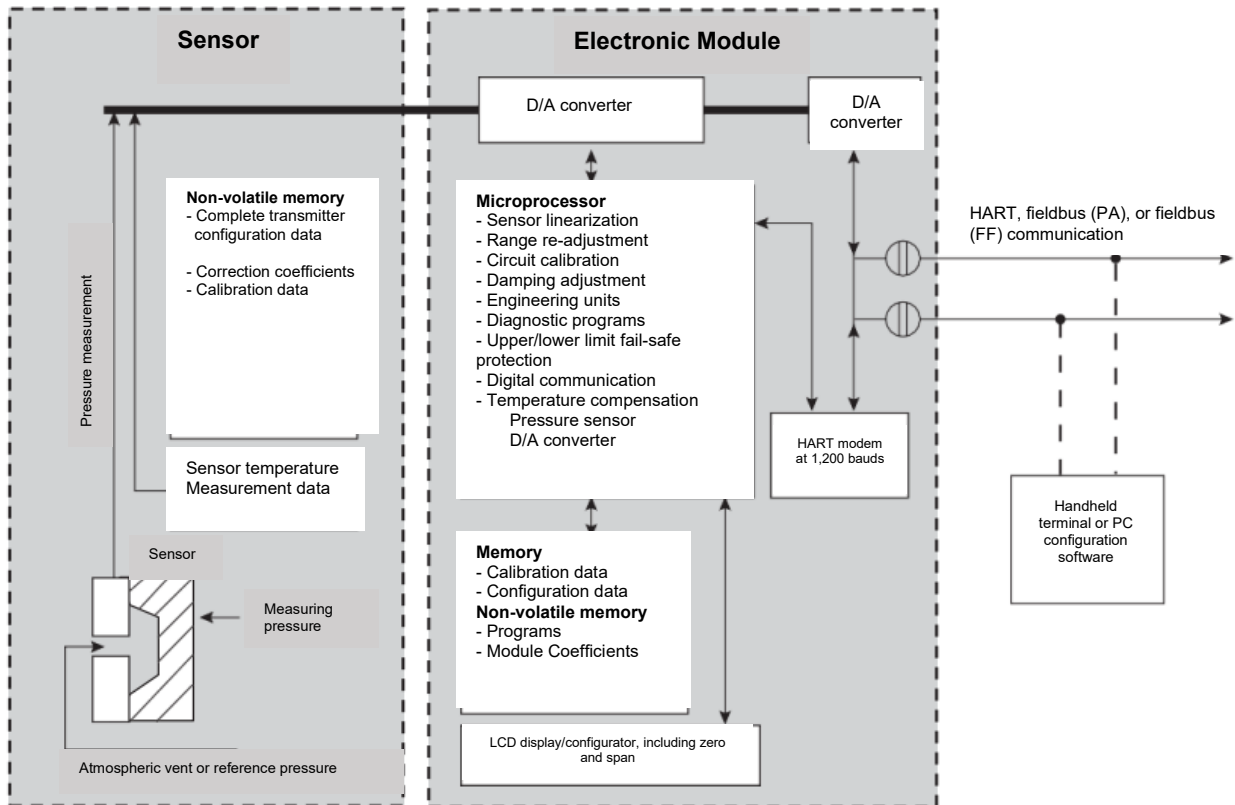


Fig. 5: Block Diagram of Intelligent Transmitter

### Electrical Safety Specifications

Certification Bodies, Protection Types, and Area Classifications	Application Conditions	Electrical Safety Codes
NEPSI: Intrinsically Safe Ex ia II C T4 Ga (a)	Temperature class T4	NA
NEPSI: Intrinsically Safe Ex ia II C T6 Ga (a)	Temperature rating T6	NB
NEPSI: Flame-proof Ex d II C T6 Gb (a)	Temperature rating T6	NC
NEPSI: Dust-proof Ex tD A21 IP67 T85°C	T85°C	ND
NEPSI: Non-sparking Ex nA II C T6 Gc (a)	Temperature rating T6	NE
ATEX: Intrinsically safe II 1 G Ex ia IIC T4 Ga	Temperature class T4	AA
ATEX: Flame-proof II 1/2 G Ex db IIC T6...T4 Ga/Gb	Temperature rating T4-T6	AD
IECEx: Intrinsically safe Ex ia IIC T4 Ga	Temperature class T4	EA
IECEx: Flame-proof Ex db IIC T6...T4 Ga/Gb	Temperature rating T4-T6	ED



No requirements

ZZ

Note: (a) Applicable ambient temperature range: -40°C to 60°C

## ATEX/IECEX Temperature Classes and Corresponding Ambient Temperatures

Ambient Temperature Range	Temperature Class	Remark
-40°C to +70°C	T6	For type “db” applications only
-40°C to +80°C	T5	
-40°C to +80°C	T4	For types “db” and “ia” applications

**Lightning Protection**DC breakdown voltage:  $\pm 20\%$  @ 100 V/s: 600VPulse discharge current: 20,000A, 8/20 $\mu$ s.....1 impact10,000A, 8/20 $\mu$ s.....> 10 impacts200A, 10/1000 $\mu$ s.....> 300 impacts200A, 10/700 $\mu$ s.....> 500 impacts

Note: A lightning protection terminal board is required

**Operating, Storage, and Transportation Conditions**

Keep the transmitter in its original packaging during transportation before reaching the installation site to prevent damage.

Storage location should meet the following conditions: temperature -40°C to 85°C; humidity  $\leq 95\%$ ; protected from rain; and minimal shock and vibration.

**Natural Environment:**

Ambient temperature: -40°C to 85°C

Process temperature: -40°C to 120°C

Relative humidity:  $\leq 95\%$ 

Atmospheric pressure: 86 kPa to 106 kPa

Mechanical environment: Vibration acceleration:  $\leq 2g$ 

Electromagnetic environment:

Magnetic field intensity:  $\leq 400A/m$ RF Interference:  $\leq 10V/m$  (80 MHz to 1 GHz)Electrostatic interference:  $\leq 8000V$ EFT/B interference:  $\leq 4000V$  (5 kHz)**Pressure Transmitter Weight (kg)**

Product Name	Product Series	Aluminum Alloy Housing	Stainless Steel Housing
Gauge pressure or absolute pressure transmitter (directly-mounted)	SGP10/SAP10	1.5	3.9
Gauge pressure or absolute pressure transmitter (dual-chamber)	SGP20/SAP20	3.5	5.8
Differential pressure transmitter	SDP10	3.5	5.8
Differential pressure transmitter (high static pressure)	SDP10-...Y	3.9	6.2
Flange-mounted transmitters (with diaphragm seal)	SLP30, SDP30, SGP30 & SAP30, SGP50 & SAP50	Sum of the weights of gauge pressure, absolute pressure, or differential pressure transmitter, diaphragm seal and flange.	

## Product Description and Model Coding

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### SGP10/SAP10 Directly-Connected Gauge Pressure & Absolute Pressure Transmitters

#### Direct Mounting

Due to their lightweight design and external threaded connections, these transmitters can be mounted directly on process piping without mounting brackets. However, mounting brackets may be used to meet special installation needs.

#### Gauge Pressure or Absolute Pressure

Available in multiple spans for gauge pressure & absolute pressure measurements. Gauge pressure ranges from 1kPa to 70MPa; absolute pressure ranges from 0.5kPa to 20MPa.

#### Superior Value Proposition

The combination of compact size, light weight, direct mounting, standard materials, and high-performance wide-range measurement capabilities makes the directly-connected instruments particularly cost-effective for process pressure measurement, offering quick and simple installation.



Directly-Connected Pressure Transmitter

## Performance Specifications

Based on zero calibration, using a silicone oil-filled 316L SS sensor.  
Unless otherwise specified, the following performance specifications are under the reference operating conditions.

URL = Upper Range Limit, Span = Calibrated Range

### Accuracy

Transmitter Accuracy for Normal Spans (Turndown Ratio ≤ 10:1)

Span Code Gauge Pressure Transmitter SGP10	Absolute Pressure Transmitter SAP10	Accuracy for Normal Spans (% of Span)
B	B, C	±0.050%
C, F, G	D, F	±0.050%
D, E	E	±0.035%

Transmitter Accuracy for Small Spans (Turndown Ratio > 10:1)

Span Code Gauge Pressure Transmitter SGP10	Absolute Pressure Transmitter SAP10	Accuracy for Small Spans (% of Span)
B	B, C	$\leq \pm(0.004 + 0.0046 \frac{\text{URL}}{\text{Span}})\%$
C, F, G	D, F	$\leq \pm(0.015 + 0.0035 \frac{\text{URL}}{\text{Span}})\%$
D, E	E	$\leq \pm(0.01 + 0.0025 \frac{\text{URL}}{\text{Span}})\%$

### Turndown Ratio

Maximum turndown ratio is 100:1.

### Long-term Stability

Annual drift less than ±0.05% of URL over five years.

### Effect of Power Voltage

Output variation less than 0.0275% of Span per volt within the specified power voltage range.

### Effect of Ambient Temperature

Under normal operating conditions, the total effect on the transmitter for every 28°C (50°F) change in ambient temperature is:  $\leq (0.06 \times \frac{\text{URL}}{\text{Span}} + 0.01)\%/28^\circ\text{C}$ , -40°C to +80°C

### Span, Measuring Range, and Overload Limit

Span, Measuring Range, and Overload Limit of SGP10 and SAP10 Transmitters

SGP10 Gauge Pressure Transmitter	SAP10 Absolute Pressure Transmitter
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Span Code	Span	Measuring Range	Overload Limit	Span	Measuring Range	Overload Limit
B	1 & 100 kPa	-100 to 100 kPa	600 kPa	0.5 & 25 kPaa	0 to 25 kPaa	300 kPaa
C	4 & 400 kPa	-100 to 400 kPa	1.5 MPa	2.6 & 130 kPaa	0 to 130 kPaa	500 kPaa
D	0.03 & 3 MPa	-0.1 to 3 MPa	4.5 MPa	5 & 500 kPaa	0 to 500 kPaa	1.0 MPaa
E	0.2 & 20 MPa	-0.1 to 20 MPa	30 MPa	0.03 & 3 MPa	0 to 3 MPaa	6.0 MPaa
F	0.4 & 40 MPa	-0.1 to 40 MPa	60 MPa	0.2 & 20 MPa	0 to 20 MPaa	30 MPaa
G	0.7 & 70 MPa	-0.1 to 70 MPa	105 MPa	-	-	-

Note: SGP10 gauge pressure transmitter is not recommended for long-term use under working pressures between -100 to -50kPa in vacuum conditions. For vacuum applications, absolute pressure transmitters are recommended.

**Product Model Coding: SGP10/SAP10 Directly-Connected Gauge Pressure & Absolute Pressure Transmitters**

<b>SGP10/SAP10 Directly-Connected Gauge Pressure &amp; Absolute Pressure Transmitters - Models and Description</b>		<b>Coding</b>
<b>Type</b> SGP10 intelligent directly-connected gauge pressure transmitter SAP10 intelligent directly-connected absolute pressure transmitter		<b>SGP10- SAP10-</b>
<b>Communication Mode</b> T = HART (7.0) communication @ 4 to 20 mA F = FOUNDATION Fieldbus P = PROFIBUS-PA		T F P
<b>Construction Type; Chamber; Wetted Material of Sensor Diaphragm</b> 20 = 316 ss, 316L ss 21 = 316 ss, HC 276 22 = HC 276, HC 276 SG = 316 ss, 316L ss gold-plated		20 21 22 SG
<b>Filling Fluid</b> X1 = silicone oil X2 = silicone oil (degreasing) X3 = fluorocarbon oil (degreasing)		X1 X2 X3
<b>Gauge Pressure Span</b> B = 1 & 100 kPa, 10 & 1000 mbar C = 4 & 400 kPa, 40 & 4000 mbar D = 0.03 & 3 MPa, 0.30 & 30 bar or kg/cm <sup>2</sup> E = 0.2 & 20 MPa, 2 & 200 bar or kg/cm <sup>2</sup> F = 0.4 & 40 MPa, 4 & 400 bar or kg/cm <sup>2</sup> G = 0.7 & 70 MPa, 7 & 700 bar or kg/cm <sup>2</sup>	<b>Absolute Pressure Span</b> B = 0.5 & 25 kPa, 5 & 250 mbar C = 2.6 & 130 kPa, 26 & 1300 mbar D = 5.0 & 500 kPa, 50 & 5000 mbar E = 0.03 & 3 MPa, 0.3 & 30 bar or kg/cm <sup>2</sup> F = 0.2 & 20 MPa, 2 & 200 bar or kg/cm <sup>2</sup> N/A	B C D E F G
<b>Process Connection Type</b> 1 = 1/2NPT, external thread 2 = 1/2NPT, internal thread 3 = M20x1.5, external thread 4 = G 1/2, external thread		1 2 3 4
<b>Conduit Connection and Housing</b> 1 = 1/2 NPT, internal thread, both sides, aluminum housing 2 = M20x1.5, internal thread, both sides, aluminum housing 3 = 1/2 NPT, internal thread, both sides, 316 ss housing 4 = M20 x1.5, internal thread, both sides, 316 ss housing		1 2 3 4

**Electrical Class**


NA = NEPSI intrinsically safe Ex ia IIC T4 Ga

NB = NEPSI intrinsically safe Ex ia IIC T6 Ga

NC = NEPSI dust-proof Ex tD A21 IP67 T85°C

ND = NEPSI flame-proof Exd IIC T6 Gb

NE = NEPSI non-sparking Ex nA IIC T6 Gc

AA = ATEX intrinsically safe  II 1 G Ex ia IIC T4 GaAD = ATEX flame-proof  II 1/2 G Exdb IIC T6...T4 Ga/Gb

EA = IECEx intrinsically safe Ex ia IIC T4 Ga

ED = IECEx flame-proof Exdb IIC T4...T6 Ga/Gb

ZZ = no requirements

NA

NB

NC

ND

NE

AA

AD

EA

ED

ZZ

SGP10/SAP10 Directly-Connected Gauge Pressure & Absolute Pressure Transmitters - Models and Description (continued)		Coding
<b>Option (a)</b>		
<b>Mounting Bracket and Material</b>		
M1 = horizontal, CS		-M1
M2 = horizontal, 304ss		-M2
M3 = horizontal, 316ss		-M3
M4 = vertical, CS		-M4
M5 = vertical, 304ss		-M5
M6 = vertical, 316ss		-M6
<b>Digital Display</b>		
L1 = with digital display		-L1
L2 = without digital display		-L2
<b>Lightning Protection</b>		
K = lightning protection terminal board		-K
<b>SIL2 Certification (b)</b>		
Q = SIL2 certified		-Q
<b>Copper Prohibition</b>		
LD = copper prohibited		-LD
Note: (a) The options and the main model code are separated by "-", e.g., SGP10-T20X1D11NA-M1L1Q		
(b) Not applicable for SAP10		

## Selection Examples and Ordering Information

### Model Code Specification

The main model code and the options are separated by "-".

Examples: SGP10-T20X1B21AA-M1L1;  
SAP10-T20X3B21AD-M1L2.

### Calibrated Pressure Range

For example: 10-100 kPa, 0-25 kPaa.

If it is not specified, the default factory calibrated range is: 0 to upper range limit.

### Customer Nameplate Information

Examples: Tag No. PT-101, PT-102a, etc.

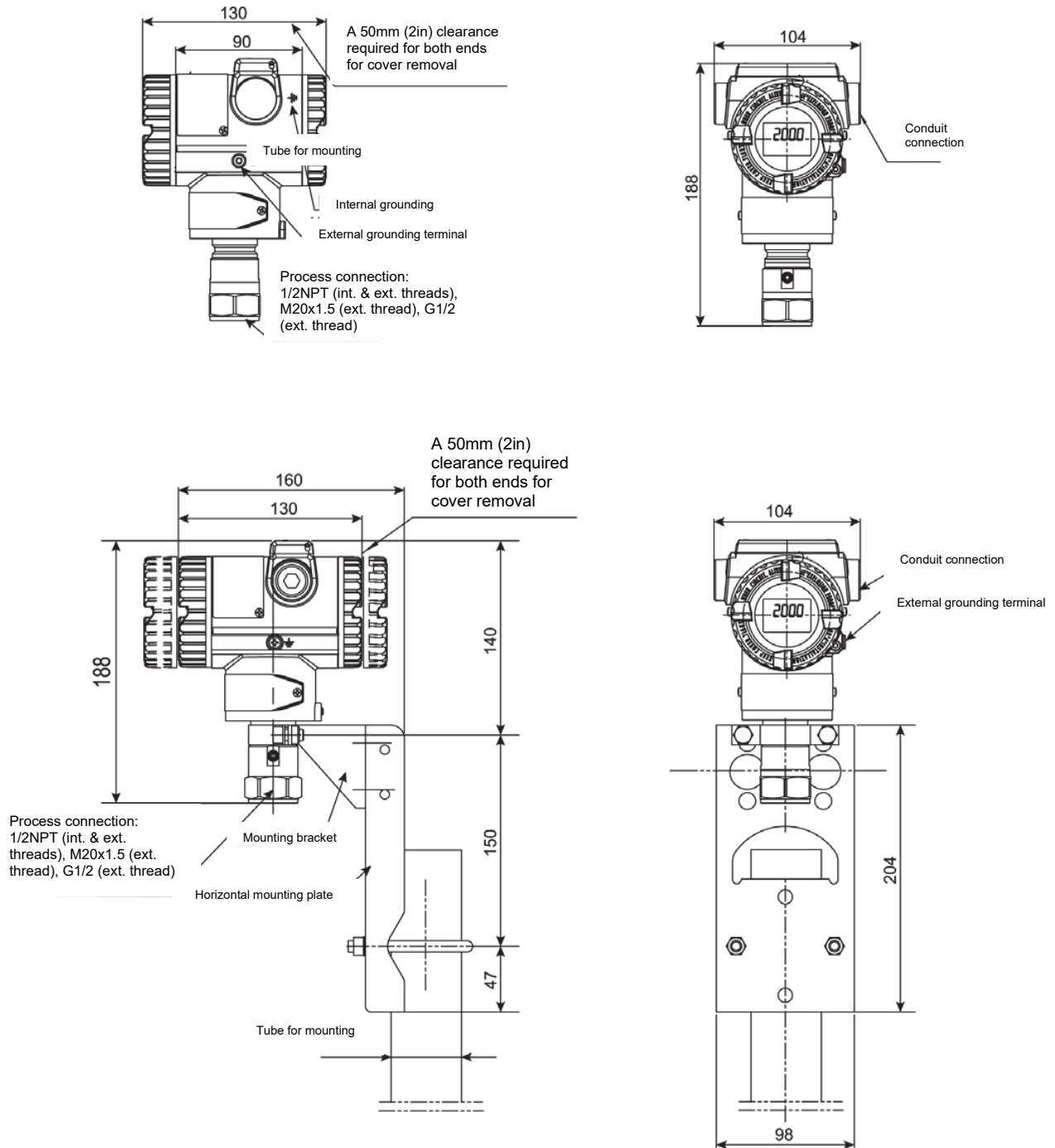
### Additional Accessories Not Included in Model Code

Note: The model code contains detailed information for each product. The final model code may change due to code compatibility requirements.

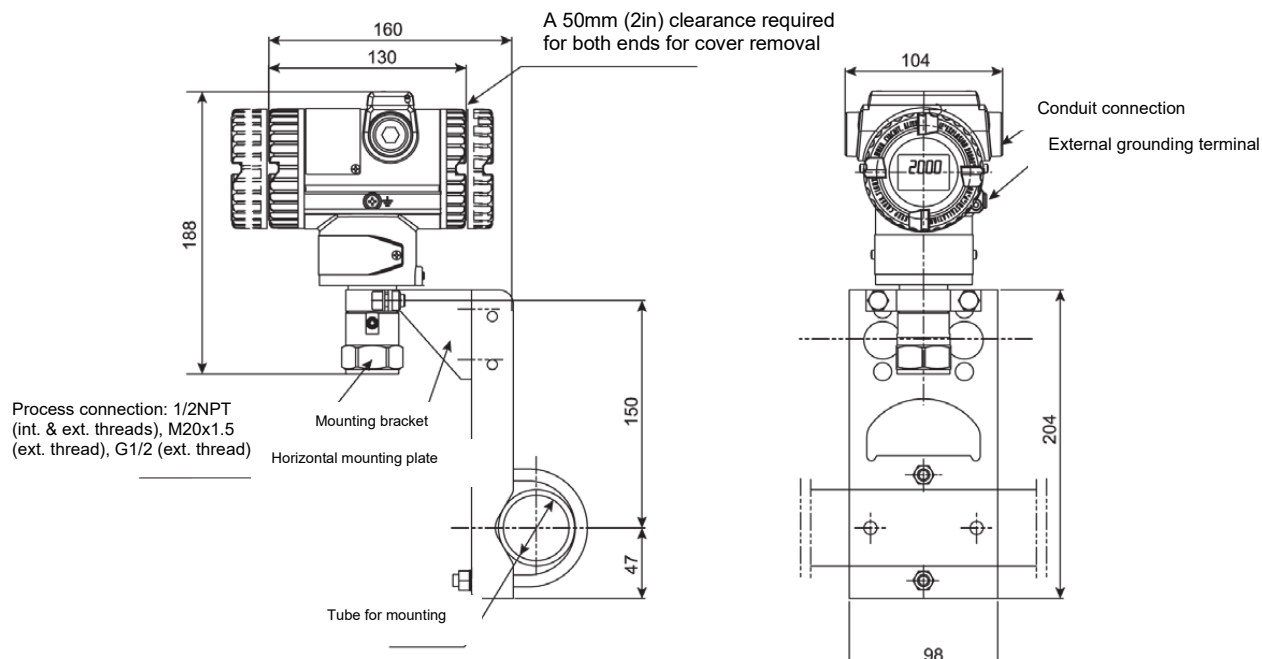


## Nominal Dimensions and Installation Dimensions (mm)

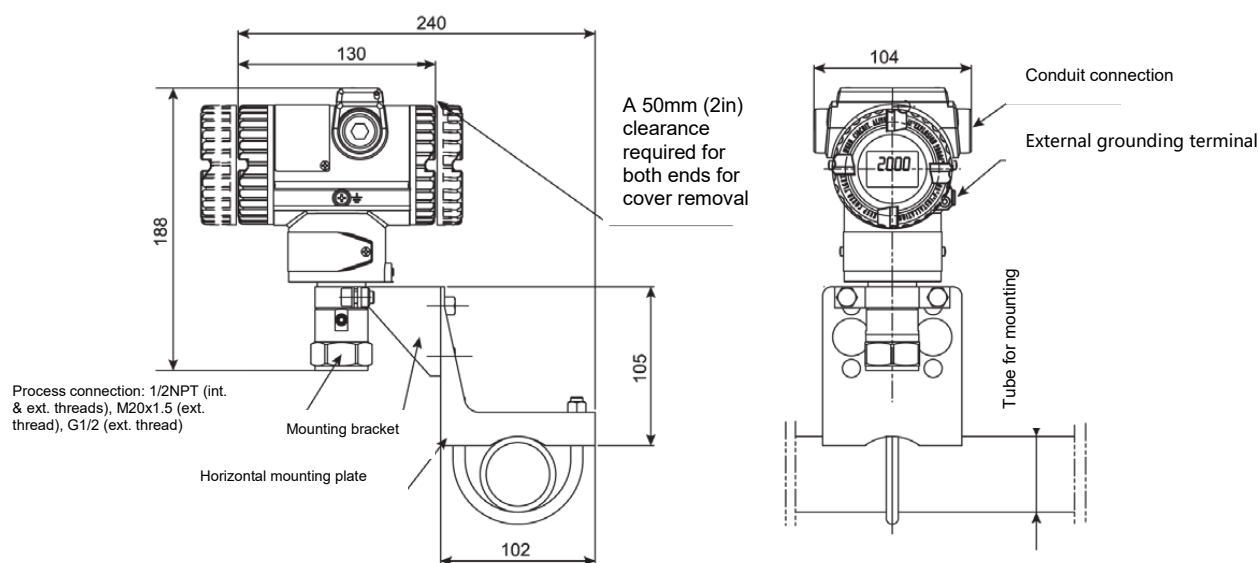
### SGP10/SAP10 Directly-Connected Gauge Pressure & Absolute Pressure Transmitters



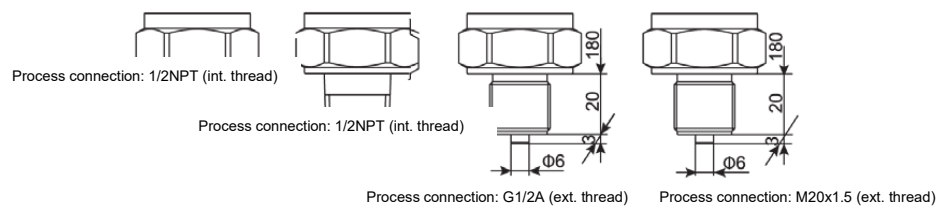
Horizontal Mounting (on A Vertical Tube)



Horizontal Mounting (on A Horizontal Tube)



Horizontal Mounting (on A Horizontal Tube)



## Flange-mounted Transmitters with Diaphragm Seal



The diaphragm seal system consists of a pressure sensing element—diaphragm seal—and the capillary tubing between the transmitter and the seal, which is evacuated and filled with a suitable filling fluid for pressure transmission. A diaphragm seal assembly can be directly connected to the transmitter or remotely connected through capillary tubes to measure gauge pressure, absolute pressure, differential pressure, flow, level, or density.

The diaphragm seal system is suitable for process fluids that are corrosive, viscous, high-temperature, toxic, require sanitary conditions, or tend to accumulate and condense. When the transmitter needs to be isolated from the process, the diaphragm seal can be installed. These transmitters with diaphragm seal are generally referred to as flange-mounted transmitters (see table below).

Seal Model	Product Series	Description	Process Connection
SEFLT-D	SLP30, flange-mounted level transmitter	Flanged type; directly mounted for level measurement	Seal directly mounted on the high-pressure side of SLP30
SEPLS-A	SDP30, remote flange-mounted differential pressure transmitter	Flanged type; identical seals on high- and low-pressure sides; remote mounting	Connected via capillary to both high- and low-pressure sides
SEPLS-B	SDP30, remote flange-mounted differential pressure transmitter	Flanged type; seal on high-pressure side; remote or direct mounting (a)	Connected via capillary or direct mounting to high-pressure side
SEPLS-C	SDP30, remote flange-mounted differential pressure transmitter	Flanged type; seal on low-pressure side; remote or direct mounting (b)	Connected via capillary or direct mounting to low-pressure side
SEPLS-D	SGP50 & SAP50, flange-mounted	Flanged type; seal on pressure measurement	Connected via capillary or direct

	gauge pressure & absolute pressure transmitters (directly-mounted)	side; remote or direct mounting	mounting to pressure measurement side
SEPLS-E	SGP30 & SAP30, flange-mounted gauge pressure & absolute pressure transmitters (dual-chamber)	Flanged type; seal on pressure measurement side; remote or direct mounting	Connected via capillary or direct mounting to pressure measurement side

## Note:

- (a) If a diaphragm seal is remotely mounted on the high-pressure side, another seal may be either remotely or directly mounted, or no seal may be required, on the low-pressure side. However, when a diaphragm seal is directly mounted on the high-pressure side, another seal must be remotely mounted on the low-pressure side.
- (b) If a diaphragm seal is remotely mounted on the low-pressure side, another seal may be either remotely or directly mounted, or no seal may be required, on the high-pressure side. However, when a diaphragm seal is directly mounted on the low-pressure side, another seal must be remotely mounted, or no seal may be required, on the high-pressure side.



### Seal Model and Description

- **Dual Seal System - Symmetrical Setup:** The transmitter is set up with two identical remote diaphragm seals, such as SEPLS-A.
- **Dual Seal System - Asymmetrical Setup:** The transmitter is set up with two different diaphragm seals, which can both be remotely-mounted, or one remotely and one directly-mounted. In special cases, the transmitter can be equipped with one remotely or directly-mounted diaphragm seal, such as SEPLS-B/SEPLS-C.
- **Single Seal System - on Measurement Side:** The transmitter is set up with one directly or remotely-mounted diaphragm seal, such as SEPLS-B, C, D, E, or SEFLT-D.

### Capillary Selection for Remote Seals

To meet remote installation requirements, flexible 316ss armored capillary tubes are available in lengths from 1 to 15 meters. Custom lengths can be manufactured based on specific requirements.

### Filling Fluid Selection for Process Temperature Requirements

Silicone oil is suitable for both low and high-temperature applications, while Fluorinert (fluorocarbon oil) is suitable for applications requiring an inert filling fluid. Depending on the selected seal, KN17 low-temperature oil is also available for extremely low-temperature process applications.

### Filling Fluid Temperature Range

Applicable temperature range: -90°C to +400°C.

### High-Temperature Stability

The seals use diaphragms with low elastic modulus, which, combined with filling fluids having low thermal expansion coefficients, minimizes temperature effects.

### Selection Guide for Flange-mounted Transmitters

A flange-mounted transmitter consists of a pressure, absolute pressure, or differential pressure transmitter and a diaphragm seal. The diaphragm seal assembly can be directly connected to the transmitter or remotely connected through interconnecting capillary tubes. Therefore, the model code of a flange-mounted transmitter consists of both the transmitter model and the diaphragm seal model.

The diaphragm seal models always begin with the prefix SE, such as SEFLT, and SEPLS.

Diaphragm seals cannot be ordered separately; both the transmitter and diaphragm seal model codes must be provided when ordering. For diaphragm seal models, please refer to the model codes, selection examples, and ordering information for a variety of flange-mounted transmitters below.

The model code contains detailed information for each product. The final model code may change due to code compatibility requirements.

## SLP30 Flange-mounted Level Transmitter

The SLP30 flange-mounted level transmitter is composed of a diaphragm seal directly mounted to a differential pressure transmitter. It is a transmitter with flush or extended diaphragm for direct mounting, capable of measuring the level or interface of the medium in open vessels, pressure vessels, or vacuum vessels. This transmitter-seal measurement system provides accurate and reliable measurements.



Flange-mounted Level Transmitter

## Accuracy

Transmitter Accuracy for Normal Spans (Turndown Ratio  $\leq 10:1$ )

Span Code - Level Transmitter SLP30	Accuracy for Normal Spans (% of Span)
B	$\leq \pm(0.06 + 0.044 \frac{\text{URL}}{\text{Span}})\%$ , turndown ratio $\leq 5:1$
C, D, E, G	$\pm 0.050\%$

Transmitter Accuracy for Small Spans (Turndown Ratio  $> 10:1$ )

Span Code - Level Transmitter SLP30	Accuracy for Normal Spans (% of Span)
B	-
C, D, E, G	$\leq \pm(0.02 + 0.003 \frac{\text{URL}}{\text{Span}})\%$ , turndown ratio $> 10:1$

**Turndown Ratio**

Maximum turndown ratio is 30:1.

**Long-term Stability**

Annual drift less than  $\pm 0.05\%$  of URL over five years.

**Overpressure and Static Pressure Limits**

Nominal pressure of flange

**Effect of Power Voltage**

Output variation less than 0.0275% of Span per volt within the specified power voltage range.

**Effect of Ambient Temperature**

Under normal operating conditions, the total effect on the transmitter for every 28°C (50°F) change in ambient temperature is:  $\leq (0.06 \times \frac{\text{URL}}{\text{Span}} + 0.2)\%/28^\circ\text{C}$ , -40°C to +80°C.

**Span and Measuring Range**

Span and Measuring Range of SLP30 Flange-mounted Level Transmitter

Span Code	SLP30 Flange-mounted Level Transmitter	
	Span	Measuring Range
B	2.0 & 10 kPa	-10 to 10 kPa
C	5.0 & 100 kPa	-100 to 100 kPa
D	16 & 500 kPa	-500 to 500 kPa
E	0.1 & 3 MPa	-0.5 to 3 MPa
F	0.4 & 10 MPa	-0.5 to 10 MPa

**Process Pressure, Temperature Limit, ANSI & BS/DIN Flanges**

ANSI S25C Carbon Steel (Category 1.3) and 304 Stainless Steel (Category 2.1)						
Process Pressure (°C)	Max Allowable Working Pressure (in bar) - S25C Carbon Steel			Max Allowable Working Pressure (in bar) - 304 Stainless Steel		
	Class 150	Class 300	Class 600	Class 150	Class 300	Class 600
≤38	18.4	48	96	19	49.6	99.3
50	18.2	47.5	94.9	18.3	47.8	95.6
100	17.4	45.3	90.7	15.7	40.9	81.7
150	15.8	43.9	87.9	14.2	37	74
200	13.8	42.5	85.1	13.2	34.5	69
250	12.1	40.8	81.6	12.1	32.5	65
ANSI 316 Stainless Steel (Category 2.2) and 316L Stainless Steel (Category 2.3)						
Process Pressure (°C)	Max Allowable Working Pressure (in bar) - 316 Stainless Steel			Max Allowable Working Pressure (in bar) - 316L Stainless Steel		
	Class 150	Class 300	Class 600	Class 150	Class 300	Class 600
≤38	19	49.6	99.3	15.9	41.4	82.7
50	18.4	48.1	96.2	15.3	40	80
100	16.2	42.2	84.4	13.3	34.8	69.6
150	14.8	38.5	77	12	31.4	62.8
200	13.7	35.7	71.3	11.2	29.2	58.3

250	12.1	33.4	66.8	10.5	27.5	54.9		
<b>DIN S25C Carbon Steel (Category 1C3) and 304 Stainless Steel (Category 2C1)</b>								
Process Pressure (°C)	Max Allowable Working Pressure (in bar) - 1C3 Carbon Steel				Max Allowable Working Pressure (in bar) - 2C3 Stainless Steel			
	PN10/16	PN25/40	PN64	PN100	PN10/16	PN25/40	PN64	PN100
20	16	40	63	100	14.7	36.8	57.9	91.9
50	16	40	63	100	14.2	35.4	55.8	88.6
100	15.6	39	61.4	97.4	12.1	30.3	47.7	75.7
150	15.2	38	59.8	94.9	11	27.5	43.4	68.8
200	14.7	36.9	58.1	92.2	10.2	25.5	40.2	63.9
250	14	35.1	55.2	87.6	9.6	24.1	37.9	60.2

<b>DIN 316 Stainless Steel (Category 2C2) and 316L Stainless Steel (Category 2C3)</b>								
Process Pressure (°C)	Max Allowable Working Pressure (in bar) - 2C2 Stainless Steel				Max Allowable Working Pressure (in bar) - 2C3 Stainless Steel			
	PN10/16	PN25/40	PN64	PN100	PN10/16	PN25/40	PN64	PN100
20	14.7	36.8	57.9	91.9	12.3	30.6	48.3	76.6
50	14.3	35.6	56.1	89.1	11.8	29.6	46.6	74
100	12.5	31.3	49.2	78.1	10.2	25.5	40.2	63.9
150	11.4	28.5	44.9	71.3	9.2	23.1	36.4	57.8
200	10.6	26.4	41.6	66	8.5	21.2	33.5	53.1
250	9.8	24.7	38.9	61.8	7.9	19.8	31.1	49.4

Do not exceed the pressure-temperature limits listed in the tables for the ANSI and BS/DIN flanges and corresponding materials.



#### Temperature Limits for Diaphragm Seals and Capillary Filling Fluids

Filling Fluid	Temperature Limit
DC200-2, silicone oil	-40 & +205°C (-40 to +401°F)
Fluorocarbon oil (Fluorinert)	-50 & +150°C (-58 to +302°F)

Note: Do not exceed the pressure-temperature limits of the flanges.



## SLP30 Flange-mounted Level Transmitter

SLP30 Flange-mounted Level Transmitter - Model and Description		Coding
<b>Type</b> SLP30 intelligent level transmitter		<b>SLP30 -</b>
<b>Communication Mode</b> T = HART (7.0) communication @ 4 to 20 mA F = FOUNDATION Fieldbus P = PROFIBUS-PA		T F P
<b>Construction Type: with Diaphragm Seal</b> F1 = seal on high-pressure side, single flange		F1
<b>Measuring Range</b> B = 2 & 10 kPa, 20 & 100 mbar C = 5 & 100 kPa, 50 & 1000 mbar D = 16 & 500 kPa, 160 & 5000 mbar E = 0.1 & 3 MPa, 1 & 30 bar or kg/cm <sup>2</sup> F = 0.4 & 10 MPa, 4 & 100 bar or kg/cm <sup>2</sup>		B C D E F
<b>Conduit Connection and Housing</b> 1 = 1/2 NPT, internal thread, both sides, aluminum housing 2 = M20x1.5, internal thread, both sides, aluminum housing 3 = 1/2 NPT, internal thread, both sides, 316 ss housing 4 = M20x1.5, internal thread, both sides, 316 ss housing		1 2 3 4
<b>Electrical Class</b> NA = NEPSI intrinsically safe Ex ia IIC T4 Ga NB = NEPSI intrinsically safe Ex ia IIC T6 Ga NC = NEPSI dust-proof Ex tD A21 IP67 T85°C ND = NEPSI flame-proof Exd IIC T6 Gb NE = NEPSI non-sparking Ex nA IIC T6 Gc AA = ATEX intrinsically safe  II 1 G Ex ia IIC T4 Ga AD = ATEX flame-proof  II 1/2 G Exdb IIC T6...T4 Ga/Gb EA = IECEx intrinsically safe Ex ia IIC T4 Ga ED = IECEx flame-proof Exdb IIC T4...T6 Ga/Gb ZZ = no requirements		NA NB NC ND NE AA AD EA ED ZZ
<b>Option (a)</b>		
<b>Digital Display</b> L1 = with digital display L2 = without digital display		-L1 -L2
<b>Material of Chamber Bolts (alloy steel 35CrMo standard)</b> B1 = 304ss B2 = 316ss		-B1 -B2
<b>Thread on Housing for Connection (7/16-20UNF thread standard)</b> M = M10 thread		-M
<b>Surface Cleaning for Measuring Unit</b> D = degreasing and cleaning		-D
<b>Lightning Protection</b> K = lightning protection terminal board		-K

<b>SIL2 Certification</b> Q = SIL2 certified	-Q
<b>Copper Prohibition</b> LD = copper prohibited (e)	-LD
<b>SEFLT Diaphragm Seal (b)</b> Seal Setup D = single seal, directly mounted on high-pressure side	/SEFLT- D

SLP30 Flange-mounted Level Transmitter - Model and Description (continued)			Coding
<b>Flange Type (single flange, with seal directly mounted on high-pressure side)</b> F = flush flange E = extended flange			F E
<b>Dimension of Flange</b> <div> <div>Flush flange</div> <div>Extended flange</div> <div>Insert diameter</div> </div> 1 = 1 in. (25 mm), DN25 2 = 2 in. (50 mm), DN50 3 = 3 in. (80 mm), DN80 4 = 4 in. (100 mm), DN100 2 = 2 in. (50 mm), DN50 3 = 3 in. (80 mm), DN80 4 = 4 in. (100 mm), DN100 48mm 71mm 96mm			1 2 3 4
<b>Material of Diaphragm on High-pressure Side</b> S = 316Lss H = HC 276 (c) M = Monel T = Tantalum (d) D = 316L ss gold-plated R = Titanium			S H M T G R
<b>Length of Extended Diaphragm Seal on High-pressure Side (0mm for flush flange)</b> 0 = 0 mm (flush flange) 2 = 2 in. (50 mm) 4 = 4 in. (100 mm) 6 = 6 in. (150 mm) 8 = 8 in. (200 mm) X = 10 in. (250 mm)			0 2 4 6 8 X
<b>Material of Extended Flange Cylinder of Diaphragm Seal on High-pressure Side</b> Z = no cylinder (flush flange) S = 316Lss H = HC 276 M = Monel D = 2205 dual-phase steel			Z S H M D
<b>Flange Standard and Pressure Class</b> A = ANSI 150 B = ANSI 300 C = ANSI 600 G = DIN PN 10/16 H = DIN PN 25/40 J = DIN PN 64 K = DIN PN 100			A B C G H J K
<b>Type of Flange Seal</b> 1 = RF (raised face) 2 = RJ (ring joint face) 3 = M (male) 4 = FM (female)			1 2 3 4

**Material of Flange**

A = CS

B = 304ss

C = 316ss

D = 316Lss

A

B

C

D

SLP30 Flange-mounted Level Transmitter - Model and Description (continued)		Coding
<b>Filling Fluid</b>	<b>Temperature Range</b>	
1 = silicone oil	-40 °C to 205 °C	1
2 = silicone oil (degreasing)	-40 °C to 205 °C	2
3 = fluorocarbon oil (degreasing)	-50 °C to 150 °C	3
<b>Wetted Material on Low-pressure Side: Chamber &amp; Sensor Diaphragm</b>		
SS = 316Lss, 316ss		SS
SH = 316ss, HC 276		SH
HH = HC 276, HC 276		HH
SM = 316ss, Monel		SM
MM = Monel, Monel		MM
ST = 316 ss, Tantalum		ST
<b>Type of Process Connection on Low-pressure Side</b>		
1 = 1/4NPT, internal thread		1
2 = 1/2NPT, internal thread		2
<b>Option</b>		
<b>Flushing Ring: Material &amp; Specification</b>		
1R1 = 304ss, 1/4NPT + plug, 1 flushing hole		-1R1
1R2 = 316Lss, 1/4NPT + plug, 1 flushing hole		-1R2
1R3 = 304ss, 1/2NPT + plug, 1 flushing hole		-1R3
1R4 = 316Lss, 1/2NPT + plug, 1 flushing hole		-1R4
2R1 = 304ss, 1/4NPT + plug, 2 flushing holes		-2R1
2R2 = 316Lss, 1/4NPT + plug, 2 flushing holes		-2R2
2R3 = 304ss, 1/2NPT + plug, 2 flushing holes		-2R3
2R4 = 316Lss, 1/2NPT + plug, 2 flushing holes		-2R4
<b>Coating of Diaphragm</b>		
C1 = PTFE diaphragm (applicable for DN50 and DN80 flush flanges only under positive pressure)		-C1
C2 = PTFE coated (applicable for 316L and HC-276 only; used only for mild-corrosive media when in negative pressure (vacuum) conditions)		-C2
C3 = PFA coated (applicable for 316L and HC-276 only under positive pressure)		-C3
<b>High Temperature in Directly-mounted Applications</b>		
X = applicable temperature range from 205 °C to 250 °C		-X
<b>Note:</b> (a) The options and the main model code are separated by "-". (b) The diaphragm seal and transmitter models are separated by "/". (c) Avoid using HC-276 for the diaphragm if the span is less than 10kPa and the flange is not bigger than DN50. (d) The minimum span should be ≥5kPa if the span B (2 & 10 kPa, 20 & 100 mbar) is selected with a flush flange of 1 in. (25 mm), DN25, and a tantalum diaphragm on the high-pressure side. (e) Not applicable for Monel.		

## Selection Examples and Ordering Information

### Model Code Specification

The model code is comprised of the codes of the transmitter and flanged seal. The transmitter model and the seal model are separated by “/”.

Examples: SLP30-TF1C1NA-L1 / SEFLT-DF2S0ZA1B1-SS1;

1	2	└─ Single seal, directly mounted on high-pressure side
Transmitter model	Seal model	

### Calibrated Pressure Range:

Examples: 5-50 kPa, 0-100 kPa.

If it is not specified, the default factory calibrated range is: 0 to upper range limit.

### Customer Nameplate Information

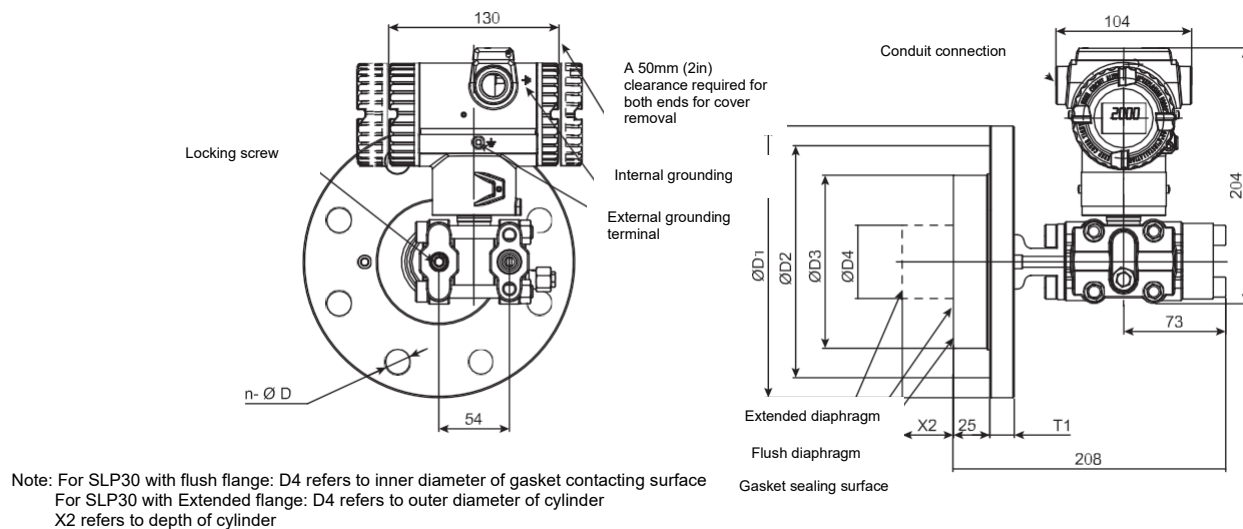
Examples: Tag No. PT-101, LT-101, etc.

### Additional Accessories Not Included in Model Code

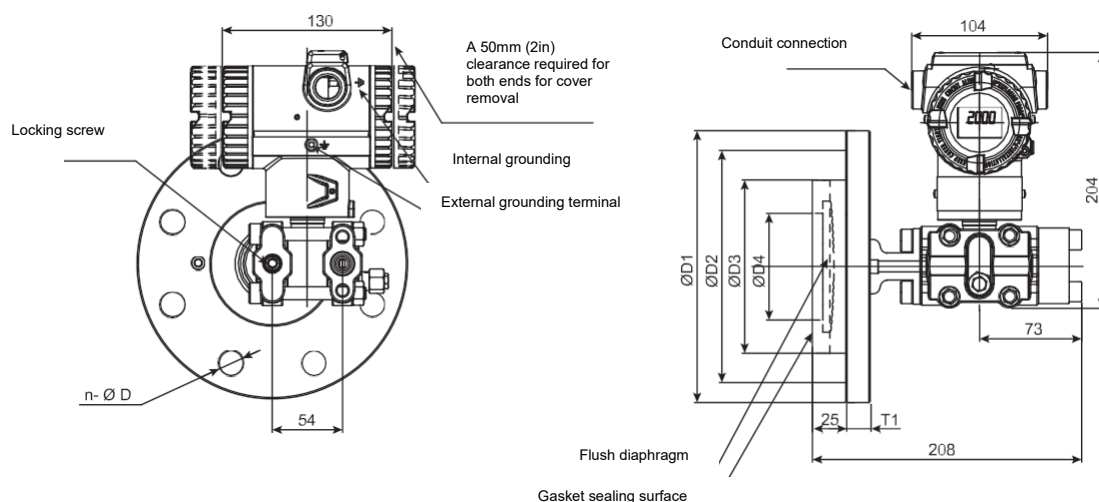
Note: The model code contains detailed information for each product. The final model code may change due to code compatibility requirements.



## Nominal Dimensions and Installation Dimensions (mm)

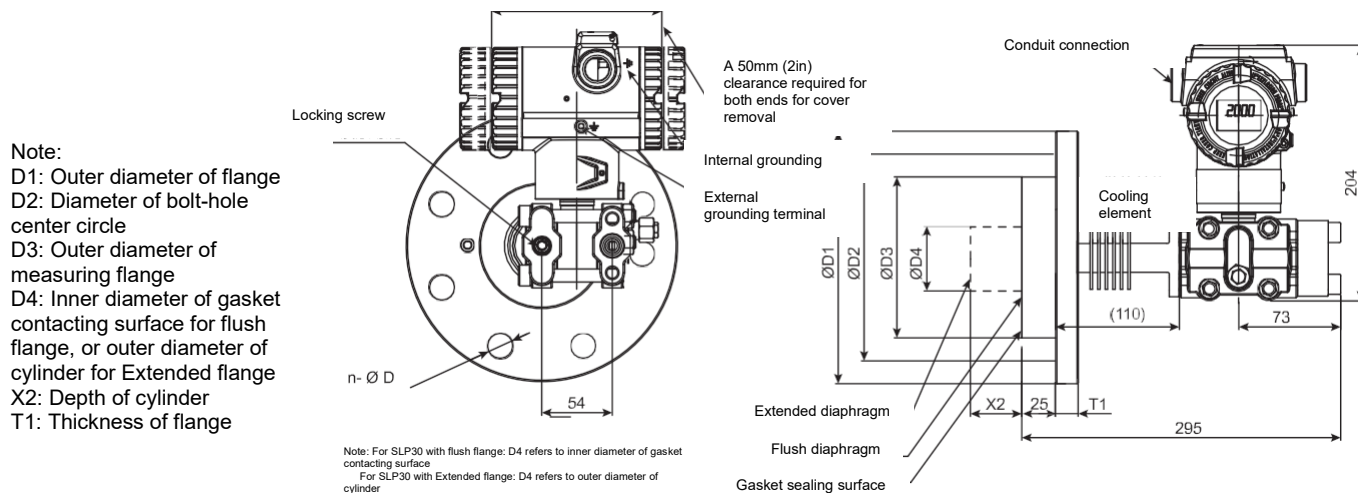


### SLP30 Flange-mounted Level Transmitter



Note: For SLP30 flush flange with DN25 embedded structure: D4 refers to inner diameter of gasket contacting surface

### SLP30 with DN25 Flush Flange Embedded Structure



### SLP30 with Flush Flange Directly-connected for High-temperature Applications

**Dimension Chart of Flange****Dimensions of Flange DN25 (Embedded)**

Flange Standard	D1	D2	D3	D4	T1	n (bolt number)	d (bolt-hole diameter)
ANSI 150	110	79.4	66	34	12.7	4	16
ANSI 300	125	88.9	66	34	15.9	4	18
ANSI 600	125	88.9	66	34	17.5	4	18
DINPN10/16	115	85	66	34	18	4	14
DIN PN25/40	115	85	66	34	18	4	14
DIN PN64/100	140	100	66	34	24	4	18

**Dimensions of Flush Flange DN50**

Flange Standard	D1	D2	D3	D4	T1	n (bolt number)	d (bolt-hole diameter)
ANSI 150	150	120.7	100	61	19.5	4	18
ANSI 300	165	127	100	61	22.7	8	18
ANSI 600	165	127	100	61	32.4	8	18
DINPN10/16	165	125	100	61	18	4	18
DIN PN25/40	165	125	100	61	20	4	18
DIN PN64	180	135	100	61	26	4	22
DIN PN100	195	145	100	61	28	4	26

**Dimensions of Flush Flange DN80**

Flange Standard	D1	D2	D3	D4	T1	n (bolt number)	d (bolt-hole diameter)
ANSI 150	190	152.4	130	89	24.3	4	18
ANSI 300	210	168.3	130	89	29	8	22
ANSI 600	210	168.3	130	89	38.8	8	22
DIN PN10/16	200	160	130	89	20	8	18
DIN PN25/40	200	160	130	89	24	8	18
DIN PN64	215	170	130	89	28	8	22
DIN PN100	230	180	130	89	32	8	26

**Dimensions of Flush Flange DN100**

Flange Standard	D1	D2	D3	D4	T1	n (bolt number)	d (bolt-hole diameter)
ANSI 150	230	190.5	155	115	24.3	8	18
ANSI 300	255	200	155	115	32.2	8	22
ANSI 600	275	215.9	155	115	45.1	8	26
DINPN10/16	220	180	155	115	20	8	18

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DIN PN25/40	235	190	155	115	24	8	22
DIN PN64	250	200	155	115	30	8	26
DIN PN100	265	210	155	115	36	8	30

**Dimensions of Extended Flange DN50**

Flange Standard	D1	D2	D3	D4	T1	n (bolt number)	d (bolt-hole diameter)
ANSI 150	150	120.7	100	48	19.5	4	18
ANSI 300	165	127	100	48	22.7	8	18
ANSI 600	165	127	100	48	32.4	8	18
DIN PN10/16	165	125	100	48	18	4	18
DIN PN25/40	165	125	100	48	20	4	18
DIN PN64	180	135	100	48	26	4	22
DIN PN100	195	145	100	48	28	4	26

**Dimensions of Extended Flange DN80**

Flange Standard	D1	D2	D3	D4	T1	n (bolt number)	d (bolt-hole diameter)
ANSI 150	190	152.4	130	71	24.3	4	18
ANSI 300	210	168.3	130	71	29	8	22
ANSI 600	210	168.3	130	71	38.8	8	22
DIN PN10/16	200	160	130	71	20	8	18
DIN PN25/40	200	160	130	71	24	8	18
DIN PN64	215	170	130	71	28	8	22
DIN PN100	230	180	130	71	32	8	26

**Dimensions of Extended Flange DN100**

Flange Standard	D1	D2	D3	D4	T1	n (bolt number)	d (bolt-hole diameter)
ANSI 150	230	190.5	155	96	24.3	8	18
ANSI 300	255	200	155	96	32.2	8	22
ANSI 600	275	215.9	155	96	45.1	8	26
DIN PN10/16	220	180	155	96	20	8	18
DIN PN25/40	235	190	155	96	24	8	22
DIN PN64	250	200	155	96	30	8	26
DIN PN100	265	210	155	96	36	8	30

Life Is On



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Due to changes in standards and data, the features described in this document and images contained in the data are binding on us only after confirmation by our business department.

December 2022